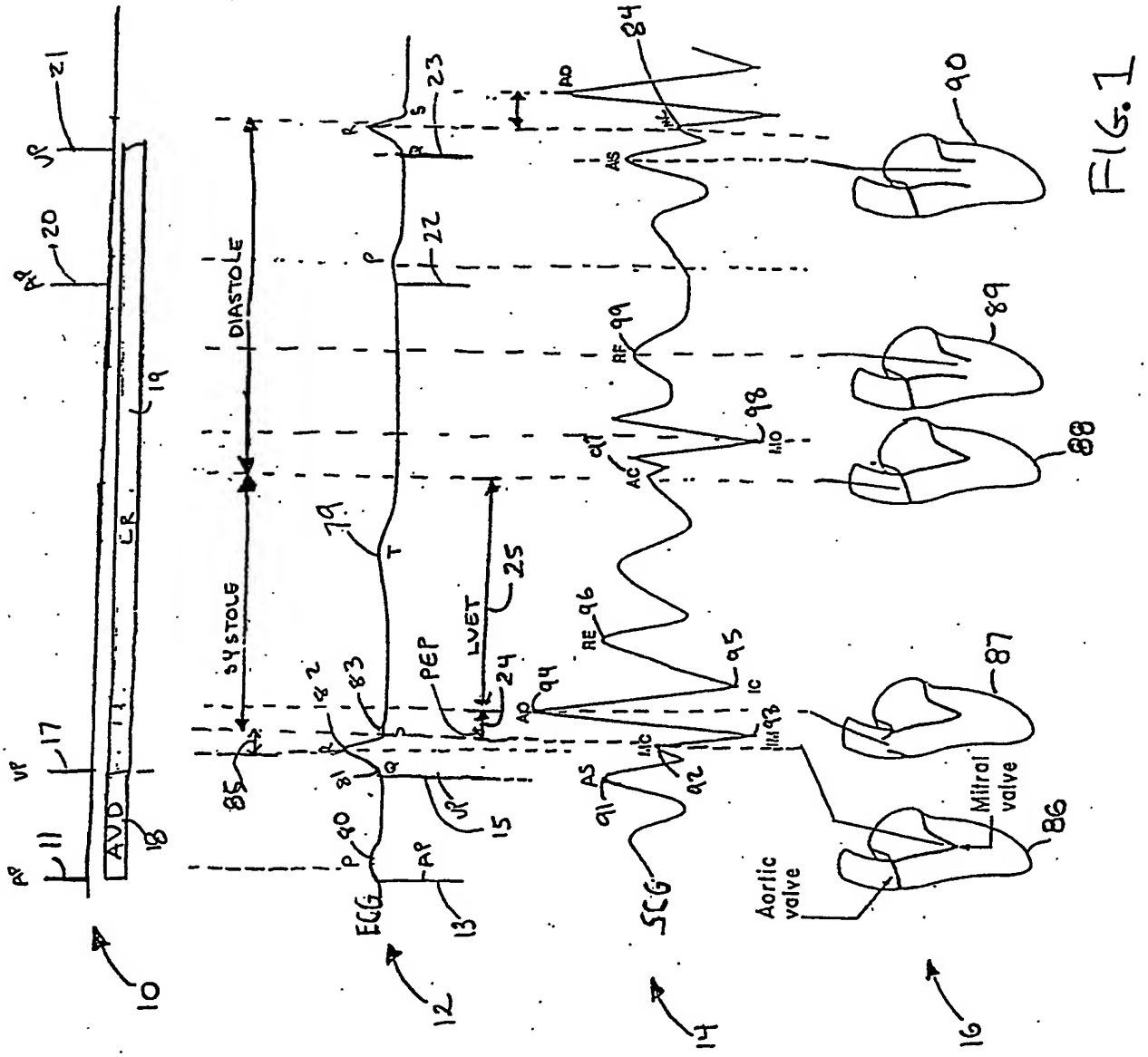

DIASTOLE
SYSTOLE
PEP
LVET
AVD
CR
ECG
SCG
Aortic valve
Mitral valve
10
12
14
16

FIG. 1

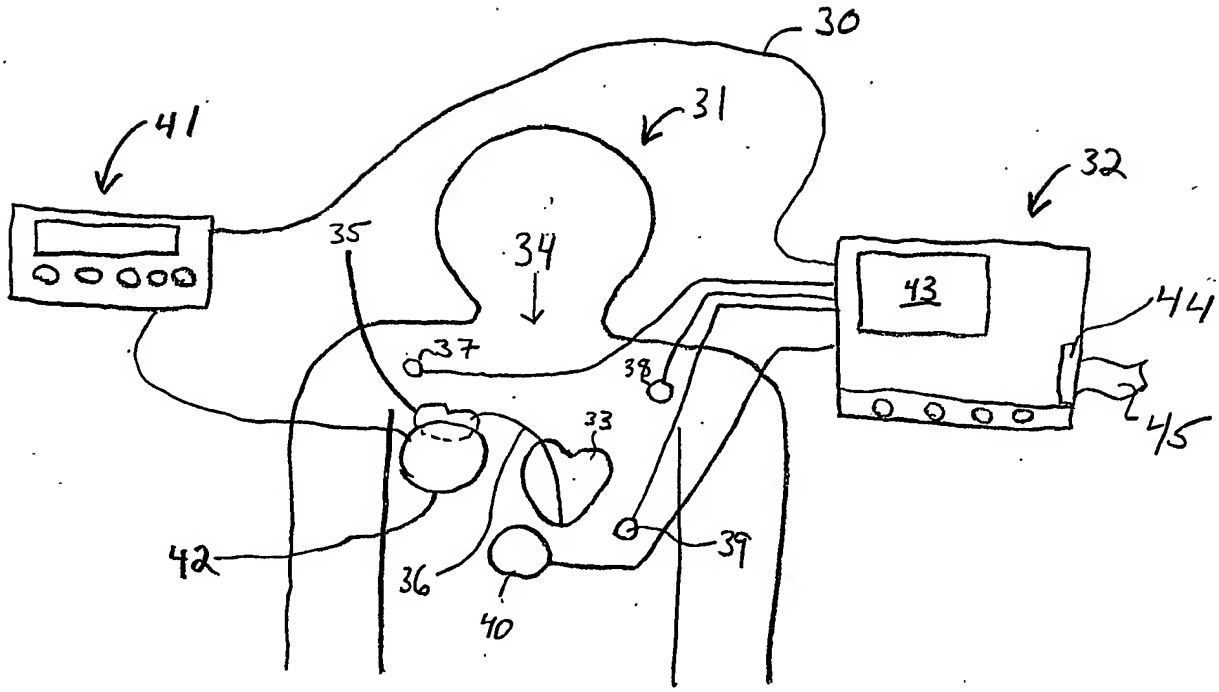


fig. 2

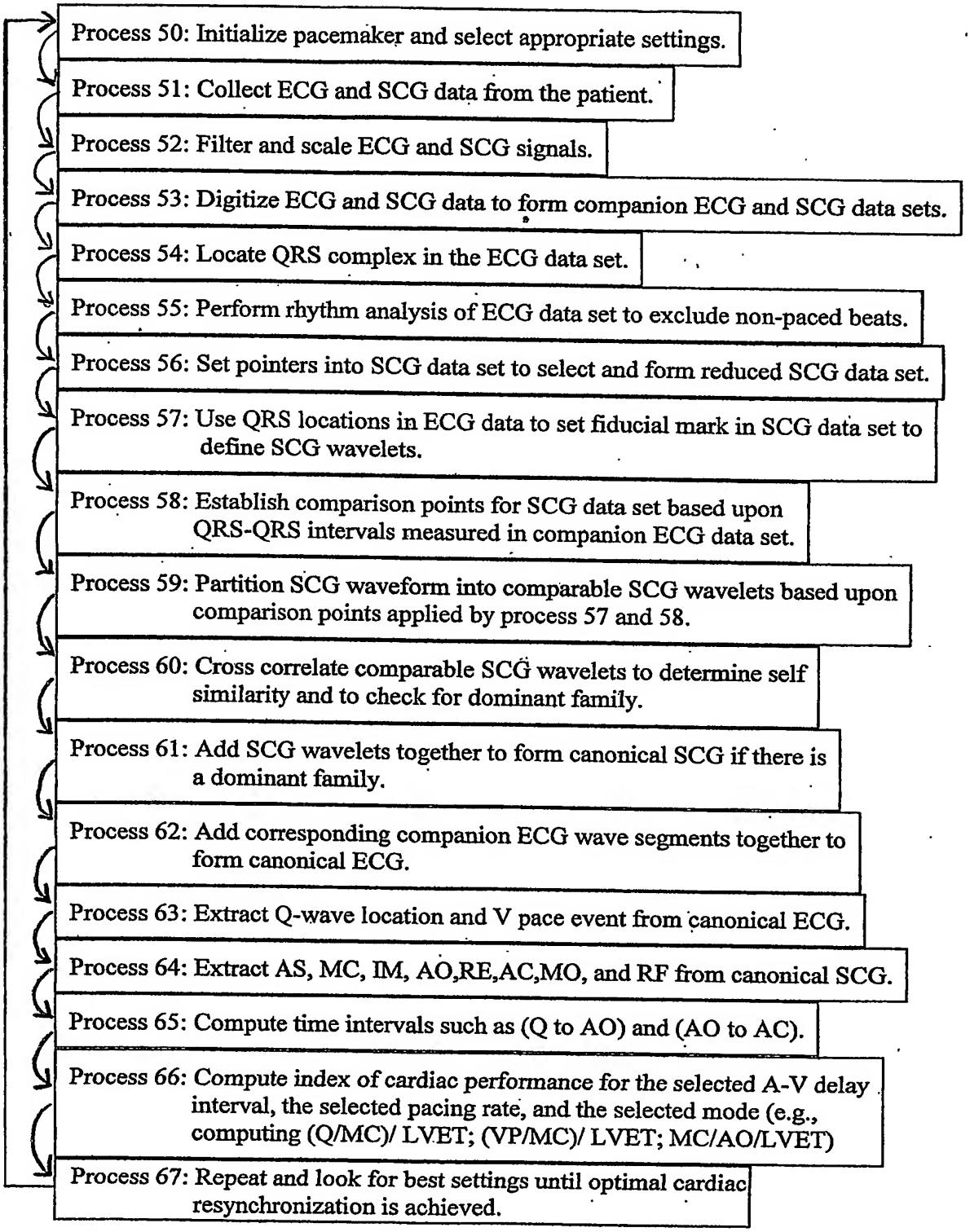
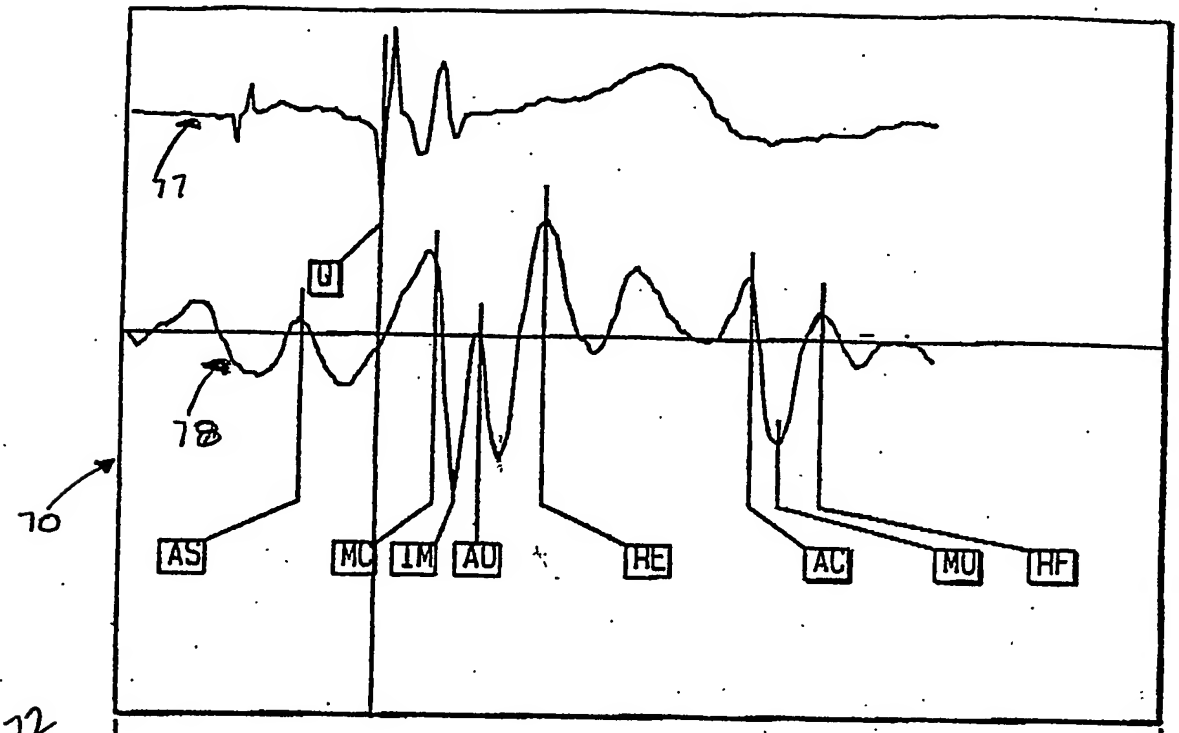

Process 50: Initialize pacemaker and select appropriate settings.
Process 51: Collect ECG and SCG data from the patient.
Process 52: Filter and scale ECG and SCG signals.
Process 53: Digitize ECG and SCG data to form companion ECG and SCG data sets.
Process 54: Locate QRS complex in the ECG data set.
Process 55: Perform rhythm analysis of ECG data set to exclude non-paced beats.
Process 56: Set pointers into SCG data set to select and form reduced SCG data set.
Process 57: Use QRS locations in ECG data to set fiducial mark in SCG data set to define SCG wavelets.
Process 58: Establish comparison points for SCG data set based upon QRS-QRS intervals measured in companion ECG data set.
Process 59: Partition SCG waveform into comparable SCG wavelets based upon comparison points applied by process 57 and 58.
Process 60: Cross correlate comparable SCG wavelets to determine self similarity and to check for dominant family.
Process 61: Add SCG wavelets together to form canonical SCG if there is a dominant family.
Process 62: Add corresponding companion ECG wave segments together to form canonical ECG.
Process 63: Extract Q-wave location and V pace event from canonical ECG.
Process 64: Extract AS, MC, IM, AO,RE,AC,MO, and RF from canonical SCG.
Process 65: Compute time intervals such as (Q to AO) and (AO to AC).
Process 66: Compute index of cardiac performance for the selected A-V delay interval, the selected pacing rate, and the selected mode (e.g., computing (Q/MC)/ LVET; (VP/MC)/ LVET; MC/AO/LVET)
Process 67: Repeat and look for best settings until optimal cardiac resynchronization is achieved.

Fig. 3



72

74

REC NUM	AV- (ms)	PEP (ms)	LVET (ms)	PEP/LVET	% CHG FROM *	AS AMP x10 -3g
1	180	188	332	0.57	32	0.37
* 2	190	128	336	0.38	0	0.90
3	200	160	316	0.51	24	3.51
4	210	148	332	0.45	14	0.40
5	220	140	328	0.43	10	0.03
6	230	132	336	0.39	3	1.67
7	240	124	324	0.38	0	-0.27
8	250	148	328	0.45	15	0.00

FIG. 4

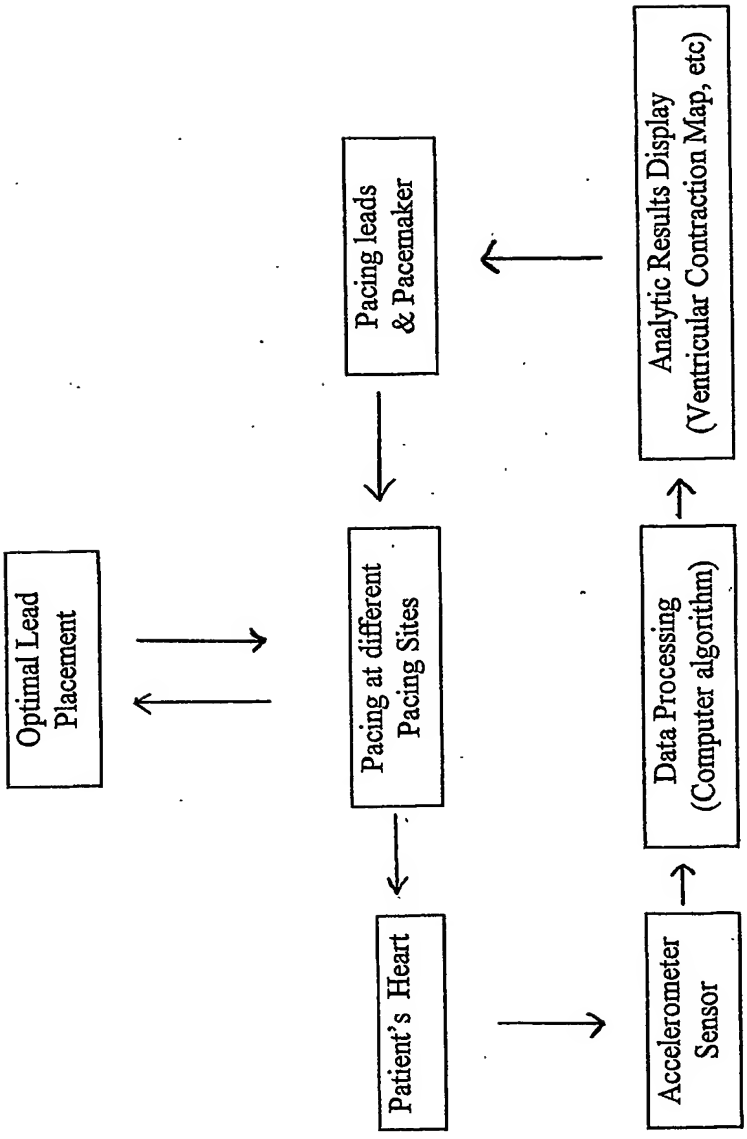

Optimal Lead Placement
Pacing at different Pacing Sites
Pacing leads & Pacemaker
Analytic Results Display (Ventricular Contraction Map, etc)
Data Processing (Computer algorithm)
Patient's Heart
Accelerometer Sensor

Fig. 5